WHAT IS CLAIMED IS:

1. A receiving method in a receiver demodulating K user signals in a plurality of user signals transmitted on the same communication channel, said receiver comprising K signal extraction parts, a signal estimation part, K joint probability calculation parts and a multiplying part, said receiving method comprising the steps of:

an ith ($1 \leqq i \leqq K$) signal extraction part extracting ith to Kth user signals;

an ith joint probability calculation part calculating a joint probability density function that any signal set in said ith to Kth user signals will be obtained if ith to Kth user signals estimated by said signal estimation part are assumed to be received;

said multiplying part multiplying probability density functions calculated by said joint probability calculation parts so that a multiplied value is obtained; and

said signal estimation part estimating first to Kth user signals which maximize said multiplied value, and outputting said first to Kth user signals to said joint probability calculation parts.

2. The receiving method as claimed in claim 1, said receiver further comprising a user estimation part, said receiving method further comprising the steps of:

said user estimation part determining which user signals should be extracted by said signal extraction parts according to variation of

communication channel state such that said probability density functions obtained by said joint probability calculation parts become maximum; and

said signal extraction parts extracting user signals determined by said user estimation part.

3. The receiving method as claimed in claim 1, said receiver further comprising K adaptive control parts, said receiving method further comprising the steps of:

an ith adaptive control part determining weight parameters on the basis of received signals and ith to Kth user signals estimated by said signal estimation part according to variation of communication channel state; and

said ith signal extraction part assigning weights to said received signals by using said weight parameters.

4. The receiving method as claimed in claim 1, said receiver further comprising an adaptive control part, said receiving method further comprising the steps of:

said adaptive control part determining weight parameters on the basis of received signals according to variation of communication channel state, and

each of said signal extraction parts assigning weights to received signals by using weight parameters determined by said adaptive control part.

5. A receiving method in a receiver demodulating K user signals in a plurality of user signals transmitted on the same communication channel, said receiver comprising K signal extraction parts, a signal estimation part, K log likelihood calculation parts and an adding part, said receiving method comprising the steps of:

an ith ($1 \leqq i \leqq K$) signal extraction part extracting ith to Kth user signals;

an ith log likelihood calculation part calculating a logarithm of a joint probability density function that any signal set in said ith to Kth user signals will be obtained if ith to Kth user signals estimated by said signal estimation part are assumed to be received;

said adding part adding logarithms calculated by said log likelihood calculation parts so that an added value is obtained; and

said signal estimation part estimating first to Kth user signals which maximize said added value, and outputting said first to Kth user signals to said log likelihood calculation part.

6. The receiving method as claimed in claim 5, said receiver further comprising a user estimation part, said receiving method further comprising the steps of:

said user estimation part determining which user signals should be extracted by said signal extraction part according to variation of communication channel state such that said

logarithms obtained by said log likelihood calculation parts become maximum; and

said signal extraction parts extracting user signals determined by said user estimation part.

7. The receiving method as claimed in claim 5, said receiver further comprising *K* adaptive control parts, said receiving method further comprising the steps of:

an *i*th adaptive control part determining weight parameters on the basis of received signals and *i*th to *K*th user signals estimated by said signal estimation part according to variation of communication channel state; and

said *i*th signal extraction part assigning weights to said received signals by using said weight parameters.

8. The receiving method as claimed in claim 5, said receiver further comprising an adaptive control part, said receiving method further comprising the steps of:

said adaptive control part determining weight parameters on the basis of received signals according to variation of communication channel state; and

each of said signal extraction parts assigning weights to received signals by using weight parameters calculated by said adaptive control part.

9. A receiver demodulating K user signals in a plurality of user signals transmitted on the same communication channel, said receiver comprising K signal extraction parts, a signal estimation part, K joint probability calculation parts and a multiplying part, wherein:

an ith ($1 \leqq i \leqq K$) signal extraction part extracts ith to Kth user signals;

an ith joint probability calculation part calculates a joint probability density function that any signal set in said ith to Kth user signals will be obtained if ith to Kth user signals estimated by said signal estimation part are assumed to be received;

said multiplying part multiplies probability density functions calculated by said joint probability calculation parts so that a multiplied value is obtained; and

said signal estimation part estimates first to Kth user signals which maximize said multiplied value, and outputs said first to Kth user signals to said joint probability calculation part.

10. The receiver as claimed in claim 9, said receiver further comprising a user estimation part for determining which user signals should be extracted by said signal extraction parts according to variation of communication channel state such that said probability density functions obtained by said joint probability calculation parts become maximum,

wherein said signal extraction parts extracts user signals determined by said user estimation part.

11. The receiver as claimed in claim 9, said receiver further comprising *K* adaptive control parts, wherein:

an *i*th adaptive control part determines weight parameters on the basis of received signals and *i*th to *K*th user signals estimated by said signal estimation part according to variation of communication channel state; and

said *i*th signal extraction part assigns weights to said received signals by using said weight parameters.

12. The receiver as claimed in claim 9, said receiver further comprising an adaptive control part for determining weight parameters on the basis of received signals according to variation of communication channel state,

wherein each of said signal extraction parts assigns weights to received signals by using weight parameters calculated by said adaptive control part.

13. A receiver demodulating *K* user signals in a plurality of user signals transmitted on the

same communication channel, said receiver comprising K signal extraction parts, a signal estimation part, K log likelihood calculation parts and an adding part, wherein:

an ith ($1 \leqq i \leqq K$) signal extraction part extracts ith to Kth user signals;

an ith log likelihood calculation part calculating a logarithm of a joint probability density function that any signal set in said ith to Kth user signals will be obtained if ith to Kth user signals estimated by said signal estimation part are assumed to be received;

said adding part adds logarithms calculated by said log likelihood calculation parts so that an added value is obtained; and

said signal estimation part estimates first to Kth user signals which maximize said added value, and outputs said first to Kth user signals to said log likelihood calculation part.

14. The receiver as claimed in claim 13, said receiver further comprising a user estimation part for determining which user signals should be extracted by said signal extraction parts according to variation of communication channel state such that said logarithms obtained by said log likelihood calculation parts become maximum,

wherein said signal extraction parts extract user signals determined by said user estimation part.

15. The receiver as claimed in claim 13, said receiver further comprising *K* adaptive control parts, wherein:

an *i*th adaptive control part determines weight parameters on the basis of received signals and *i*th to *K*th user signals estimated by said signal estimation part according to variation of communication channel state; and

said *i*th signal extraction part assigns weights to said received signals by using said weight parameters.

16. The receiver as claimed in claim 13, said receiver further comprising an adaptive control part for determining weight parameters on the basis of received signals according to variation of communication channel state,

wherein each of said signal extraction parts assigns weights to received signals by using weight parameters obtained by said adaptive control part.